

$$\underline{x\sqrt{x^2+y^2} + y^3 - z = f(x,y,z)}$$

$$\frac{\partial f}{\partial x}(4,3,0) = \sqrt{x^2+y^2} + \frac{1}{2\sqrt{x^2+y^2}} x^2 \cdot 2x$$

$$= 5 + \frac{16}{5} = \boxed{\frac{41}{5}}$$

$$\frac{\partial f}{\partial y}(4,3,0) = x \cdot \frac{1}{2\sqrt{x^2+y^2}} \cdot x^2 \cdot 2y + 3y^2$$

$$= \frac{12}{5} + 27 = \boxed{\frac{147}{5}}$$

$$\frac{\partial f}{\partial z}(4,3,0) = \boxed{-1}$$

equation of tangent plane

$$\Rightarrow \frac{41}{5}(x-4) + \frac{147}{5}(y-3) + (-1)(z-0) = 0$$

$$\Rightarrow \boxed{\frac{41}{5}(x-4) + \frac{147}{5}(y-3) = z}$$